

## **Animated mode of action - more**

### **Cell surface carbohydrates**

Carbohydrates that are linked to proteins or lipids in the cell membrane cover cell surfaces. A variety of carbohydrate structures exist. Likewise, the carbohydrate epitopes presented on a cell surface varies depending on the cell type and its state of differentiation. Additional variations also occur between species and even individuals. ABH blood group antigens are a typical example of this. Also, the proteins carrying the carbohydrates may influence the type of carbohydrate epitopes being produced and expressed by a given cell.

### **Cell surface carbohydrates of biomedical importance**

Certain cell-surface carbohydrates play crucial roles in our health and survival. For example, they help recruit host immune cells to a site of infection. They are also important determinants of self and non-self, as illustrated by the fact that blood transfusions and organ transplantations must be between individuals of the same blood group. Unfortunately, they are also involved in unwanted reactions. For instance, many bacteria and viruses have evolved to bind to these epitopes as a mean to colonize and infect humans.

### **Inhibition of physiological protein-carbohydrate interactions**

The products of Recopharma are designed to interfere with harmful carbohydrate interactions. They can be used, for instance, to prevent the binding of proteins such as antibodies and bacterial adhesions and/or toxins to specific carbohydrate epitopes. However, interfering with protein-carbohydrate interactions is complicated. This has been proven by several attempts using free oligosaccharides as inhibitors. The reason for this difficulty is that physiological protein-carbohydrate interactions, like those taking place in your body, are usually multivalent. That is, multiple copies of the binding protein bind to multiple copies of the carbohydrate ligand. This binding strengthens the interaction 10 to 10 000 fold. Consequently, monovalent inhibitors [like oligosaccharides] are prone to be unsuccessful.

Recopharma has taken advantage of this fact and utilizes a naturally multivalent ligand, a mucin, for the carbohydrate-based inhibition of protein-carbohydrate interactions. This approach has been shown to increase the affinity of the carbohydrate ligands to pico molar levels, as compared to the milli molar concentrations that are usually needed for monovalent inhibitors.